World Agriculture Watch

INTERNATIONAL TYPOLOGY OF AGRICULTURAL HOLDINGS

The Case of Vietnam

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RUDEC RURAL DEVELOPMENT CENTER

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ABRREVIATIONS

AH(s)	Agricultural Holding(s)
ARC	Agriculture Census
CIRAD	Centre International de Recherche Agronomique pour le Développement (Agricultural Research Centre for International Development)
DLP/MARD	Department of Livestock Production of the Ministry of Agriculture and Rural Development
FAO	Food and Agriculture Organization of the United Nations
GSO	General Statistical Office
HH(s)	Household(s)
IFAD	International Fund for Agricultural Development
LSMS	Living Standards Measurement Survey
MARD	Ministry of Agriculture and Rural Development
RIGA	Rural Income Generating Activities (Project)
VHLSS	Vietnam Household Living Standard Survey
WAW	World Agriculture Watch

SUMMARY

International typology of agricultural holdings: The case of Vietnam

The typology of agricultural holdings (AHs) aims to characterise different types of production structures and assess their relative importance. The dynamics of these different types allow the transformation of agriculture to be monitored over time to design pertinent support policies for agricultural production units. This paper presents the results of a typology of agricultural holdings in Vietnam that was carried out with a methodology discussed in the WAW initiative. The typology of agricultural households and commercial farms is based on rural household data from the 2010 Vietnamese Household Living Standard Survey (VHLSS) and on commercial farm data from the 2011 Agricultural and Rural Census (ARC). Three variables, capturing (i) the professional qualifications of holding heads (qualifications), (i) the use of family labor in agricultural production (labor), and (iii) the commercialization level of agricultural products (sales), were used for the typology. The statistical method used for the classification was the Partitioning K-mean method. The results suggest that agricultural households and commercial farms in Vietnam can be divided into 5 groups which we propose to name as follows: semi-subsistence household farms (Group 1); market-oriented household farms (Group 3), medium commercial farms (Group 5), large commercial farms (Group 2) and very large commercial farms (Group 4). The groups have clearly different characteristics that confirm the pertinence of the 3 variables used in the typology exercise. Our work demonstrates the importance of large commercial farms in the current transformation of Vietnamese agriculture. However, household farms (Group 1 and Group 3) still constitute around 99% of the 10.4 million rural households in the country.

Table 1: Summary of the results of the typology

	Different types	Analysis per variable and way forward
Professional qualifications of head of agricultural holding (AH)	Six-level ordered variable: 1. No certificate 2. Elementary vocational school 3. Vocational school 4. Vocational college 5. College 6. Professional	
Share of family labor used in agricultural production of holding (in	Continuous variable from 0 to 100	

%)						
Marketed share of agricultural production of AH (in %)	Continuous variable (0 to 100)					
Type of AH (Group)	1	3	5	2	4	
Type name	Semi-subsistence household farms	Market-oriented household farms	Medium commercial farms	Large commercial farms	Very large commercial farms	
% of holdings	21.1%	43.5%	17.6%	11.0%	6.7%	
% of holding's head has professional certificate	8.5%	10.1	19.4	29.2	44.1	
Family labor used in agricultural production (% hours of total agricultural production time)	98.0	99.0	59.0	33.0	15.0	
% agricultural production in value are marketed	32.0%	92%	98%	99%	98%	
Agricultural revenue (USD)	1,900	39,600	83,950	11,9900	197,100	1USD=20,000 VND
Total revenue of AH (USD)	3,700	40,600	87,650	12,2850	200,000	1USD=20,000 VND
Simpson index - agriculture	0.35	0.14	0.08	0.06	0.04	1 is the maximum value. The higher Simpson index, the more diversified are the agricultural activities
Share of revenue from agriculture in total revenue of holding	46.0	85.0	97.0	98.0	97.0	

Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO).

I. Approach and methodology

1.1. Context

Agriculture is currently undergoing rapid structural changes, such as adjustments to land tenure regimes, increased use of paid labor, rise of non-agricultural rural activities, market integration, development of new forms of production organizations (households, farms, cooperatives, companies, household, and companies), increasing adoption of technology, etc. However, little is known about the extent of these changes, their dynamics, and their impact on the organization of production. There are important gaps in terms of the quality, quantity, and availability of existing agricultural information and data, and the analysis of these structural changes is insufficient. In particular, there is as yet no tool to track and analyze the trends and dynamics of the transformation of agricultural and farming systems affecting the world's 500 million smallholder farms.

To fill these gaps, the World Agriculture Watch (WAW) global initiative was launched in October, 2011 by FAO (Rome), with the support of IFAD, CIRAD and the French Ministries of Agriculture and Foreign Affairs.

The objective of the WAW global initiative is to monitor structural changes in agriculture, and to inform policy dialogue. To achieve this, WAW aims to build a platform for knowledge generation and exchange based on a network of "local observation centers" located in selected representative areas worldwide. This framework will help to support national capacities to generate and use information for improved policy dialogue.

Accordingly, the IFAD supported project, *"Methodologies and Pilots for an International World Agriculture Watch"*, was initiated to assist the WAW to elaborate, test and validate an international typology of agricultural holdings and an associated implementation guideline based on a core set of indicators (structural characteristics, strategies and outcomes of different types of holdings in term of sustainable development, food security, poverty, employment, sustainable natural resources management). Three countries (Vietnam, Madagascar and Nicaragua) were selected for the methodological test and implementation of pilot observatories.

The specific objectives of the Project are to:

i. elaborate a first proposal based on an analysis of existing typologies and corresponding literature, exploration of variables covered by existing data (notably census and LSMS-RIGA) as well as contributions and reviews from existing partners, notably the pilot observatories of the WAW initiative;

ii. test the initiative with datasets from 3 different countries (notably census RGA and LSMS-RIGA) and support the test undertaken by the three observatories related to WAW, which will ensure that local stakeholders are properly involved and provide a review and assessment of local feasibility and relevance;
iii. incorporate lessons learned from the pilots to revise the proposed typology;
iv. organize final consultation and review to finalize the typology and ensure its adoption by key partners.

1.2. Team involved

In Vietnam, experts from the Institute of Policy and Strategy for Agriculture and Rural Development and CIRAD were involved in this initiative. Prior to this assignment, the team was involved in studying production systems, identifying key indicators to characterize and monitor agricultural households, and proposing to build a livestock monitoring system in partnership with the department of Livestock Production of the ministry of Agriculture and Rural Development (DLP/MARD). These activities were the basis for the participation of Vietnam in the WAW initiative.

1.3. Specific objectives of the national assignment

Activities carried out in Vietnam aimed to achieve the following objectives:

i. Review of Vietnamese experience on typology and participation to build an international typology of agricultural holdings methods led by WAW/FAO.
ii. Application of an international typology method using available databases in Vietnam
iii. Call for comments and feedback from Vietnamese experts on the results and method to improve the international methodology.

1.4. Methodology

1.4.1. Variables for typology

WAW/FAO experts have proposed 3 variables for the typology of agricultural holdings at the international level:

- ***Management type:*** refers to the ownership type of an agricultural holding: individual, household, farm, cooperative, enterprise,
- ***Labor***: refers to the labor used on an agricultural holding. A distinction is made between family and hired labor. An agricultural holding can use either only one labor source (family or hired labor) or a combination of labor sources (family and hired labor)
- ***Commercialization****:* refers to the level of commercialization and trading of an agricultural holding's production.

Workshops were organized to solicit comments from experts on the international typology proposed by WAW.

- Many experts were in favor of using a broader concept of *'agricultural holding'* in place of "farm", as it reflects all types of production organizations: households, farms, agricultural enterprises, production cooperatives, and other types of farms. The concept of 'agricultural holding' allows one to assess the general evolution of the organization of national and global agricultural production. In Vietnam, cooperatives are not considered to be a single production entity as they primarily provide support services to their members.
- It was agreed that a typology of 'agricultural holdings' (AHs) would be an interesting tool for comparing different production forms as well as for tracking changes in existing agricultural organizations (enterprises, farms, households). However, a shortage of, and disparities in, available information and data make Vietnam a difficult country in which to conduct such an exercise. Therefore, all stakeholders share a common interest in developing a general typology of AHs; and AHs are currently prioritized now in Vietnam where a household-based agricultural production system exists.
- Invited experts suggested additional variables in the typology assignment:
  + Production Input: land/ land ownership, capital/finance, labor, etc.
  + Governance: finance, production, risks
  + Ability to access markets: how many products are marketed? To whom do producers sell their products? Is there any contractual linkage between sellers and buyers? What are the types of contracts?
  + Production purposes: direction, production patterns (one or many)
  + Technology applied: intensive or semi-intensive
  + Production resources: human, capital, land…
  + Production mode: closed chain or not?
  + Production size
  + Land ownership (own or rent land)
  + Gender and education level of household heads and family decision makers
  + Region

It was suggested that the typology could be done at different levels depending on the user's need.

Based on the suggestion of experts from WAW/FAO and Vietnam, the research team conducted the first typology exercise at the national level with the following 3 variables:

- ***Labor****:* refers to the percentage of family labor in total working time (hours) used in agricultural production on the AH;

- ***Professional qualifications***: refers to the professional qualifications of the AH's head. In our opinion, this variable reflects the technical knowledge in agricultural production, managerial skills and decision making capacity of a holding. These factors define the development strategy of agricultural holdings. This variable has 6 levels: no certificate, elementary vocational school, vocational school, vocational college, college, and professional training.
- ***Commercialization****:* refers to the percentage of the AH's agricultural production that is sold.

1.4.2. Statistical methodology

Partitioning method (k-mean) is used in the exercise. The key principles of this method are: i) k-means algorithm using the within-cluster variation as a measure to form homogenous clusters. Specifically, the procedure aims to segment data in such a way that the within-cluster variation is minimized; ii) the clustering process starts by randomly assigning objects to a number of clusters. The objects are then successively reassigned to other clusters to minimize the within-cluster variation, which is basically the (squared) distance from each observation to the center of the associated cluster. If the reallocation of an object to another cluster decreases the within-cluster variation, this object is reassigned to that cluster.[2]

This method is used to take advantage of large samples (more than 12,000 observations in our sample) and to avoid subjective categorization of variables. It has been suggested that in the case of a large sample, the k-mean method is more pertinent. In addition, this method enables the use of both continuous and ordered variables.

To define the number of possible clusters, the Calinski–Harabasz stopping rule is applied. According to this rule, a large value of the Calinski Harabasz pseudo-F index indicates distinct clustering.[3] It means that the most pertinent number of clusters (groups) to be considered is the one with the highest value of the Calinski Harabasz pseudo-F.

1.5. Data

Two national available databases were used for the typology work: the 2010 Vietnam Household Living Standard Survey (VHLSS), and the 2011 Agriculture and Rural Census (ARC). Indicators of the 3 proposed variables (labor, qualifications, and commercialization) were extracted and calculated[4] from both databases. These 2 data sets

[2] Brian S. Everitt, Sabine Landau, Morven Leese, and Daniel Stahl. Cluster analysing. 5th edition, p.255-256.
[3] Calinski, T., and J. Harabasz 1974. A dendrite method for cluster analysis. Communications in Statistics 3: 1–27.
[4] It took time to calculate these 3 variables and other variables for characterization of clustered groups.

were used simultaneously because: (i) for institutional reasons, we had restricted access to the ARC 2011 database; (ii) neither the ARC 2011 nor the VHLSS 2010 were sufficient to characterize the diversity of agricultural farms.[5]

In Vietnam, the GSO and MARD differentiates 2 types of agricultural farms (MARD-GSO, 2000[6]): Agricultural Households (*Nông Hộ)* and Commercial Farms (*Trang Trại*).

- An agricultural household (*Nông hộ)* is a single household which practices agricultural production. It also can be called a "household farm" since the English concept of "farm" can be translated into many words into Vietnamese, including "Nong Hộ".
- A commercial farm (*Trang Trại*) is an agricultural enterprise which is recognized as a producer of agricultural, forestry or aquaculture goods and operates at a "large scale". Compared to a household farm, a commercial farm is more concentrated and specialized, has higher management capacity in terms of technical knowledge and innovation, uses both "household" and "hired" labor, is more efficient, and generates higher income (MARD-GSO, 2000). The conditions under which the "commercial farms certificate" is attributed by District authorities are regularly revised by MARD and by the provincial government (MARD, 2011[7]).

The VHLSS, which only provides only household (HH) level data (it includes no data from big commercial farms), captures a lot of details regarding HH economic activities. Meanwhile, the ARC provides data on both commercial farms and households, but the HH-level information is not sufficient to calculate indicators of the 3 variables to be used in the typology. Hence, in order to test the WAW methodology, VHLSS and ARC data[8] were combined to produce an integrated data set on agricultural households (from VHLSS) and on commercial farms (from ARC[9]). While data from the VHLSS 2010 were available in full free of charge, only some variables from the ARC 2011 were provided by the GSO upon request.

[5] An agricultural farm is an independent production unit which can be owned by one or several individuals or households.

[6] Circular 69/2000/TTLT/BNN-TCTK, dated 23/06/2000 and jointly issued by the Ministry of Agriculture and Rural Development (MARD) and the General Statistical Office (GSO) of the government of Vietnam on "*guiding criteria for determining the commercial farms economy*", Hanoi, 3 pages.

[7] See circular n° 27/2011/TT-BNNPTNT of MARD dated 13/4/2011 on "Regulation for criteria and procedures for the attribution of the "Commercial farm" certificate".

[8] From each database of VHLSS and ARC, we calculated 3 expected variables, and then merged them to create an integrated data set for the typology. The integrated data set has a variable for separating commercial farms and households. We combined commercial farm and household data to test the relevance of proposed variables since the value of the variables used is different. That is good condition for typology.

[9] ARC also captures household information, but the HH-level information is not sufficient for the calculation of the 3 variables used for the typology. Only information on farms was used in the analysis.

The data set used in our analysis includes a total of 12,737 individual holdings, of which 4,734 agricultural households[10] (37.2% of the sample size) were extracted from the VHLSS 2010 and 8,003[11] (62.8%) commercial farms (*Trang Trại)* were extracted from the ARC 2011. This sample includes agricultural holdings under all production systems seen in all regions of Viet Nam. **Erreur ! Source du renvoi introuvable.** and 2 present the distribution of the labor and commercialization variables. From this data set, we conducted a characterization of 5 clustered groups with a limited number of variables.

Figure 1: Distribution of use of family labor in agricultural holdings

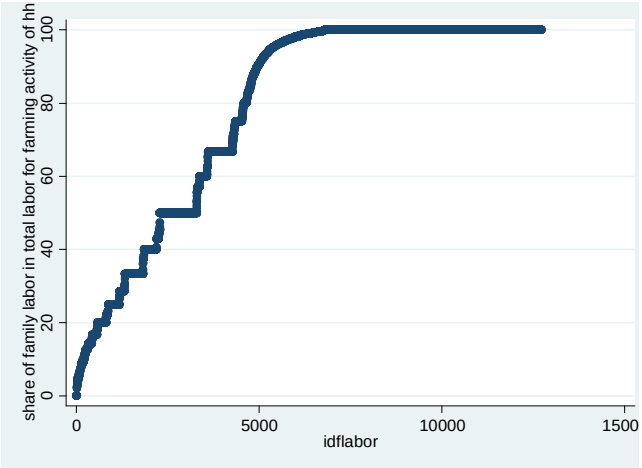
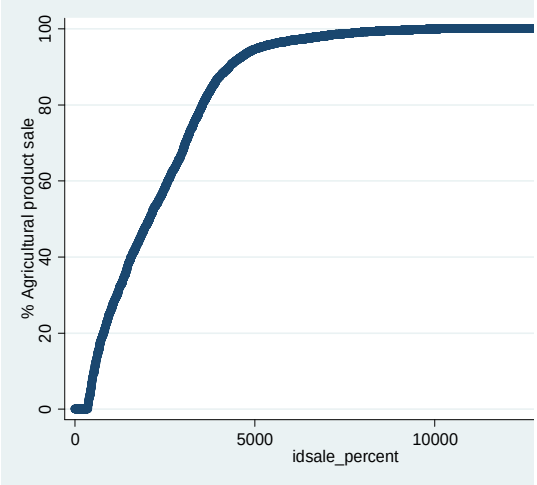


Figure 2: Distribution of percentage of agricultural product sale of agricultural holdings



Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO).

Table 2: Frequency of professional qualifications of the heads of agricultural HHs and commercial farms

Qualification of head	Code	Freq.	Percent
No certificate	1	10,715	84.12
Elementary vocational school	2	645	5.06
Vocational school	3	826	6.49
Vocational college	4	45	0.35
College	5	81	0.64
Professional	6	425	3.34
Total		12,737	100

Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO).

Table 3: Definition of the variables used for the typology

[10] VHLSS 2010 surveyed a total of 9,402 households, out of those, 961 (10.2%) of HHs have missing or erroneous data on 3 identified variables (qualification, labor, market), and 3,707 (39.4%) are urban or non-agricultural households. The available data therefore allowed us to do the exercise with 4,734 HHs.

[11] Out of the 22,000 farms surveyed in the ARC, GSO only provided a data set of 8,011 farms from 8 regions (of which 8 observations are missing or erroneous).

Dimension	Definitions / indicators and support variables (eventually transformed)	Categories proposed: explanations over thresholds etc.
Qualifications	Professional qualifications of head of holding	Six-level ordered variable 1. No certificate 2. Elementary vocational school 3. Vocational school 4. Vocational college 5. College 6. Professional
Labor	% family labor in total labor used in agricultural production of AH	Continuous variable (0% - 100%)
Commercialization	% of holding's agricultural production is sold	Continuous variable (0% - 100%)

II. Results of the typology with data on farms (ARC) and households (VHLSS)

The typology was done using 3 background variables to reach from 2 to 6 clusters. According to the Calinski–Harabasz stopping rule, 5 clusters are produced because this typology option has the highest Calinski–Harabasz pseudo – F value.

Table 4: value of the Calinski–Harabasz pseudo-F

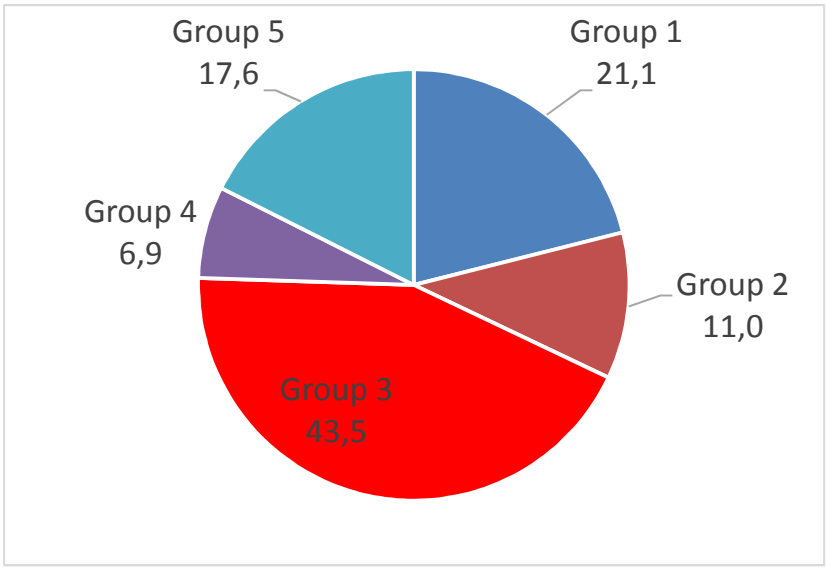
Number of Clusters	Calinski Harabasz pseudo-F
2	13 707.81
3	8 728.81
4	6 033.85
5	**27 321.44**
6	22 345.51

2.1. Distribution of groups

The size of each cluster in the overall sample differs from each other. Specifically,

- Group 1 represents 21.1% of total holdings (Household: 20.9%; Farm: 0.2%).
- Group 2 represents 11.0% of total holdings: (Farm: 10.9%; Household: 0.1%).
- Group 3 represents 43.5% of total holdings (Farm: 28.3%, Household: 15.2%).
- Group 4 represents 6.9% of total holdings (Farm: 6.7%, Household: 0.2%).
- Group 5 represents 17.6% of total holdings (Farm: 16.8%; Household: 0.8%).

Figure 3: Breakdown of total holdings by group



Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

Table 5: Breakdown of holding groups by Household and Commercial Farm

Group	Share of total holdings (%)	In which	
		Household (%)	Commercial farm (%)
1	21.1	20.9	0.2
2	11.0	0.1	10.9
3	43.5	15.2	28.3
4	6.9	0.2	6.7
5	17.6	0.8	16.8
Total	100.0	37.2	62.8

Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO

Table 5 shows that Groups 2, 4, 5 are characterized by more farms than Group 1, which features household farms, while Group 3 includes both household and commercial farms. In other words, the majority of household farms are distributed in Group 1 and Group 3, while the majority of commercial farms are distributed in Group 2, Group 3, Group 4 and Group 5.

2.2. Characteristics of groups

The five groups are characterized by the following variables[12]:

- Professional qualifications of agricultural holding head

[12] Some other variables are suitable for characterizing agricultural holdings such as land size, productive asset, number of family member and labor, access to credit, access to public services. However, these variables are not available because they do not exist or we cannot get access to the database.

- Family labor in total labor used in agricultural production (%, in hours)
- Proportion of agricultural production sold (%, in value)
- Share of agricultural income in total income of holdings: this variable captures a holding's production strategy (farm *vs.* non-farm activities).
- Total agricultural income of holding: this variable captures the size of the agricultural production of holdings.
- Total income of holding: this variable captures the size of all economic activities of holdings.
- Simpson index - agriculture: this variable measures the diversity of agricultural activities of holdings. It is assumed that more diversified economic activities will help small HHs to reduce risks.

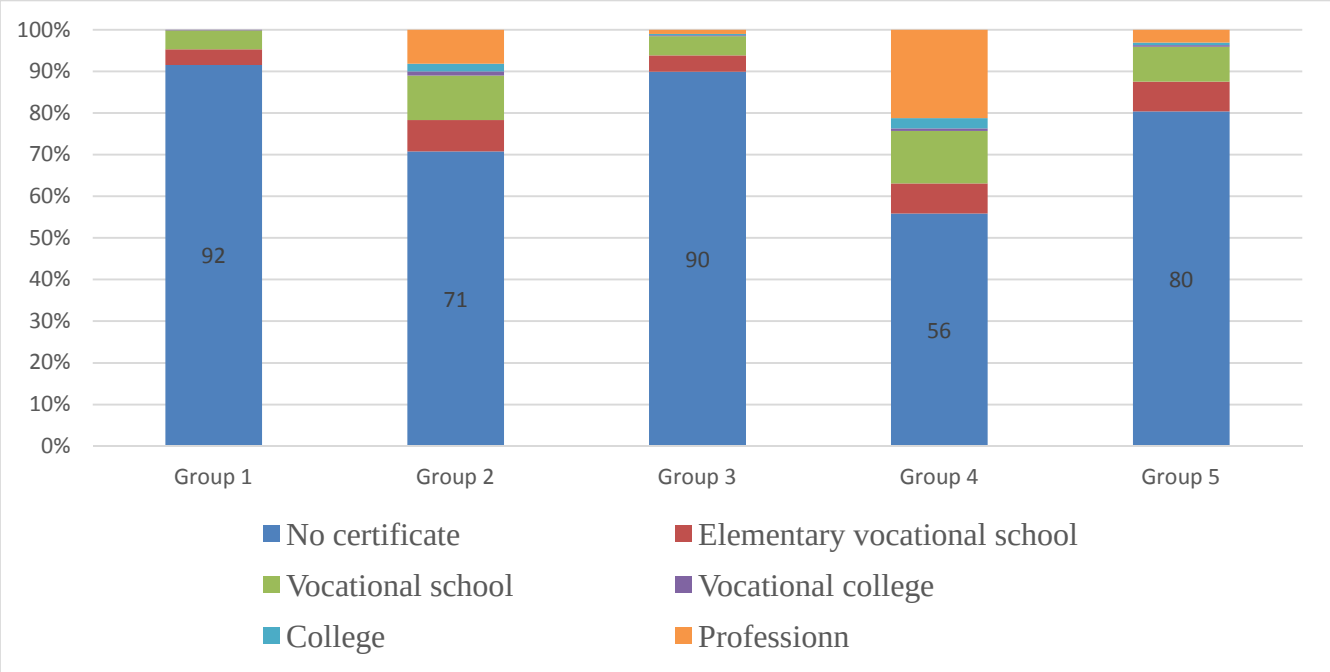
Table 6: Professional qualifications of holding heads by group (%)

Group	No certificate[13]	Elementary vocational school	Vocational school	Vocational college	College	Professional	Total
1	91.55	3.72	4.58	0.15	0.00	0.00	100
2	70.79	7.50	10.71	1.00	1.86	8.14	100
3	89.88	3.92	4.61	0.23	0.36	0.99	100
4	55.87	7.18	12.66	0.57	2.51	21.21	100
5	80.39	7.15	8.35	0.40	0.58	3.13	100
Total	**84.12**	**5.06**	**6.49**	**0.35**	**0.64**	**3.34**	**100**

Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

Figure 4: Professional qualifications of holding heads

[13] Someone is awarded a certificate when s/he has completed at least one training offered among: elementary vocational school, vocational school, vocational college, college, university, or short-term agricultural vocational training (program at least of 3 months in agricultural sector).



Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

Table 7: Characteristics of groups by variable

Group	% Agricultural product sale	% of family labor in total labor used in agricultural production of AHs	Agricultural Revenue (USD)	Total revenue of holding (USD)	Simpson index - agriculture	% of agricultural revenue in total revenue of holding
Group 1	32.0	98.0	1,900	3,700	0.35	46.0
Group 2	99.0	33.0	119,900	122,850	0.06	98.0
Group 3	92.0	99.0	39,600	40,600	0.14	85.0
Group 4	98.0	15.0	197,100	200,000	0.04	97.0
Group 5	98.0	59.0	83,950	87,650	0.08	97.0
Total	82.0	79.0	59,100	61,100	0.16	81.0

Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

Table 8: Characteristics of groups by variable measured 100-point scale

Group	% Agricultural product sale	% of family labor in total labor used in agricultural production	Index of agricultural revenue (0 to 100)	Index of total revenue of holding (0 to 100)	Simpson index – agriculture x 100	% of agricultural revenue in total revenue
Group 1	32.0	98.0	1.0	1.9	35.0	46.0
Group 2	99.0	33.0	60.8	61.4	6.0	98.0
Group 3	92.0	99.0	20.1	20.3	14.0	85.0
Group 4	98.0	15.0	100.0	100.0	4.0	97.0

Group 5	98.0	59.0	42.6	43.8	8.0	97.0

Note: statistical tests indicate that there are differences between at least 2 groups.
(*) 100 eq. to 197,100 USD; (**) 100 eq. to 200,000 USD

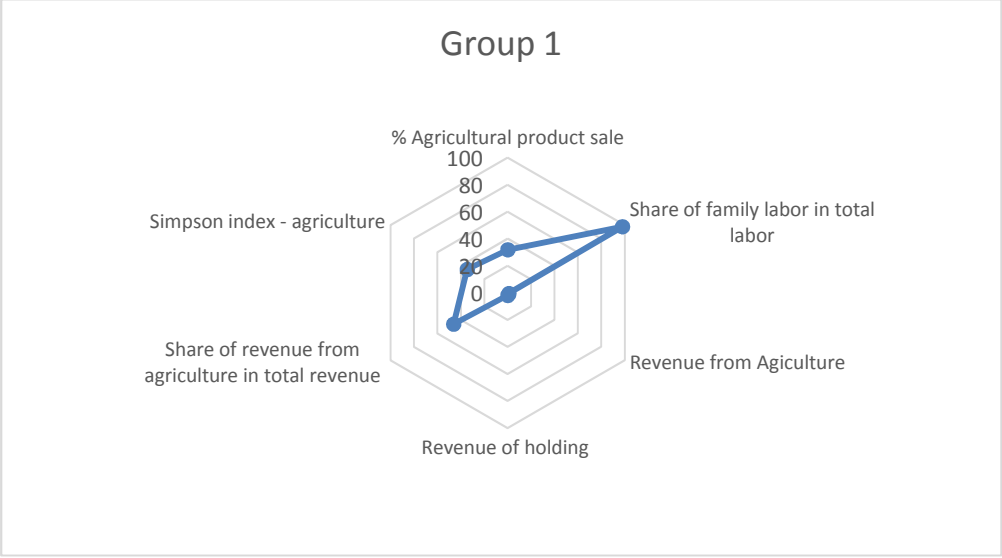
Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

2.2.1. Characterization of 5 groups by variables used

➢ ***Group 1: "semi-subsistence agricultural households"*** (21% of total sample).

The majority of agricultural holdings in this group are household farms and most holding heads do not hold a professional certificate (92%). Family labor is dominant (98% of total labor) in agricultural activities. Agricultural production follows a self-sufficiency strategy as only 32% of the agricultural production (in value) is sold. Holdings in this group diversify their activities, not only between farm and non-farm activities (as agriculture represents only 46% of their total income), but also between agricultural activities (Simpson index is 0.35, the highest point among the 5 groups). Their production scale (both agricultural and other economic activities) is the smallest among the 5 groups. On average, they earn only 1,900 USD a year from agriculture and a total annual income of 3,700 USD (equivalent to 1.0% of the agricultural income as well as 1% of the total income gained by Group 4 – the best performer). This group is named, "***semi-subsistence agricultural households***".

Figure 5: Radar-shaped characterization of Group 1



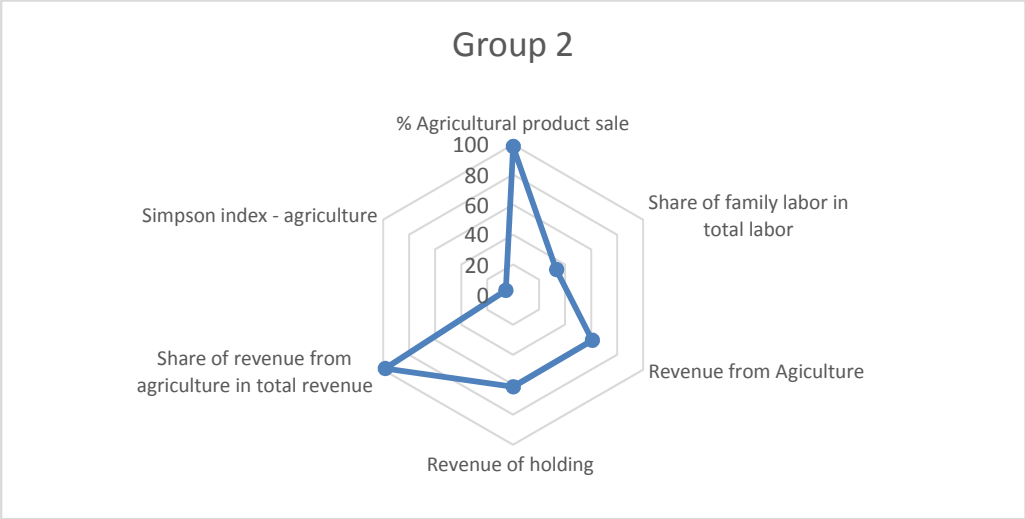
Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

➢ ***Group 2 "Large commercial farms"*** (11% of total sample)

In this group, 99.1% of the members are commercial farms (*Trang Trại*). 30% of holding heads have a professional certificate. The farms belonging to this group do market-oriented agricultural production (99% of their production is sold). Hired labor is used in their agricultural production (67%). Their agricultural activities are very specialized as

the Simpson index - agriculture is only 0.06. In terms of agricultural earnings and total income, this group is ranked second among the 5 groups.

Figure 6: Radar-shaped characterization of Group 2

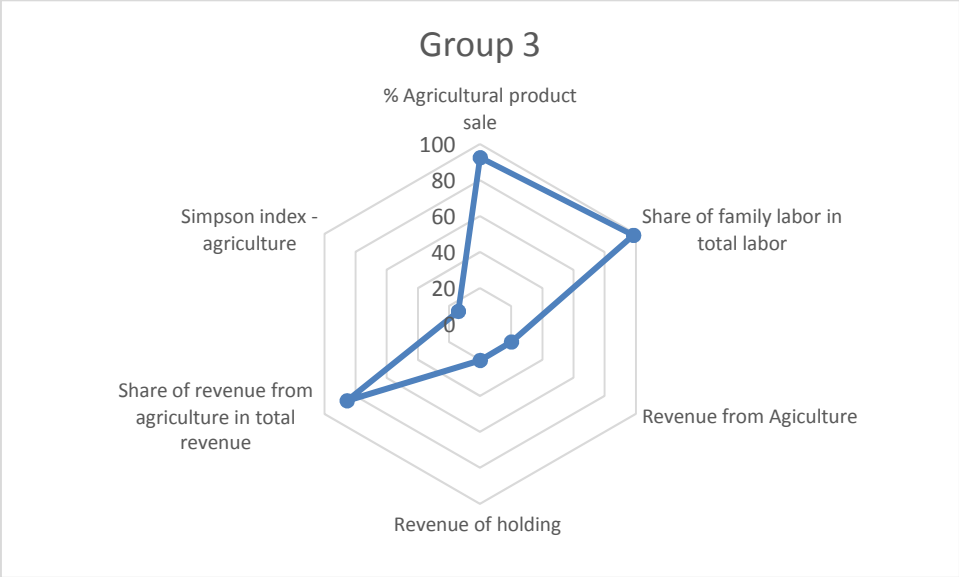


Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

- ***Group 3 - "Market-oriented household farms"*** (43.5% of sample)

This group consists of both household farms (15% of the sample) and commercial farms (28%), which indicates that the "commercial farms" (*trang trại*) category also includes household farms. In this group, 90% of holding heads do not have a professional certificate. Like Group 1, the holdings in Group 3 employ almost exclusively family labor in agricultural production. However, their agricultural production is very market-oriented (92% of agricultural production is marketed) and agricultural income occupies a very large share of total income. Agricultural activities are very diverse in comparison to other commercial farms (Simpson index is 0.14, in second place). Among the 5 groups, this group is ranked fourth in terms of the value of agricultural income and of total income.

Figure 7: Radar-shaped characterization of Group 3

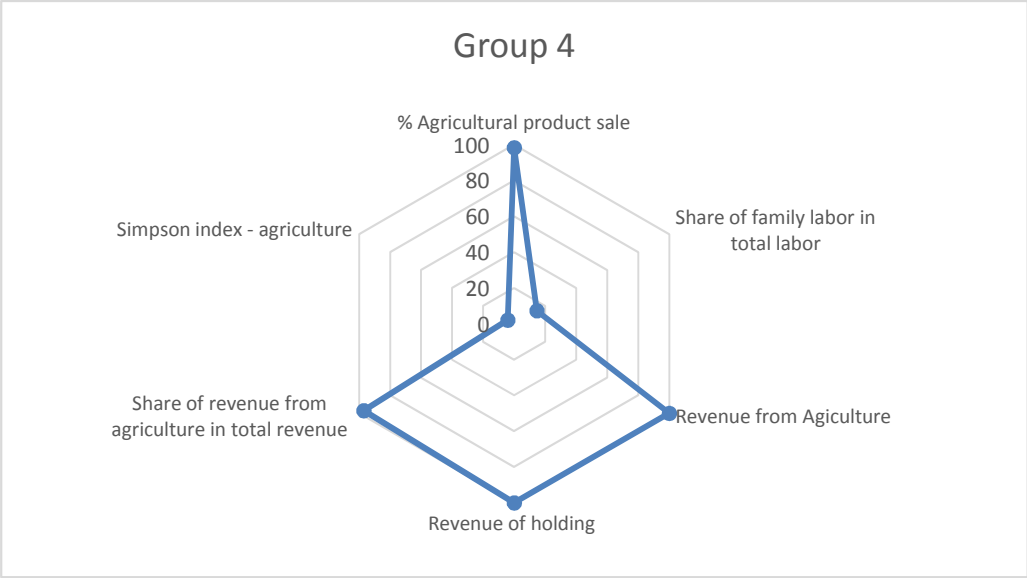


Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

- ***Group 4: "Very large commercial farms"*** (6.9% of sample)

The majority of holdings in this group are commercial farms. 44% of holding heads hold professional certificates, the highest percentage among the 5 groups. The majority of agricultural production is marketed (98%) and hired labor represents 85% of total labor used for agricultural activities, the highest level among the 5 groups. This group is also characterized by the highest specialization as their Simpson index in the agricultural sector is the lowest (0.04). Both the agricultural income and the total income of this group are the highest among the 5 groups. This group can be named, "Very large commercial farms".

Figure 8: Radar-shaped characterization of Group 4

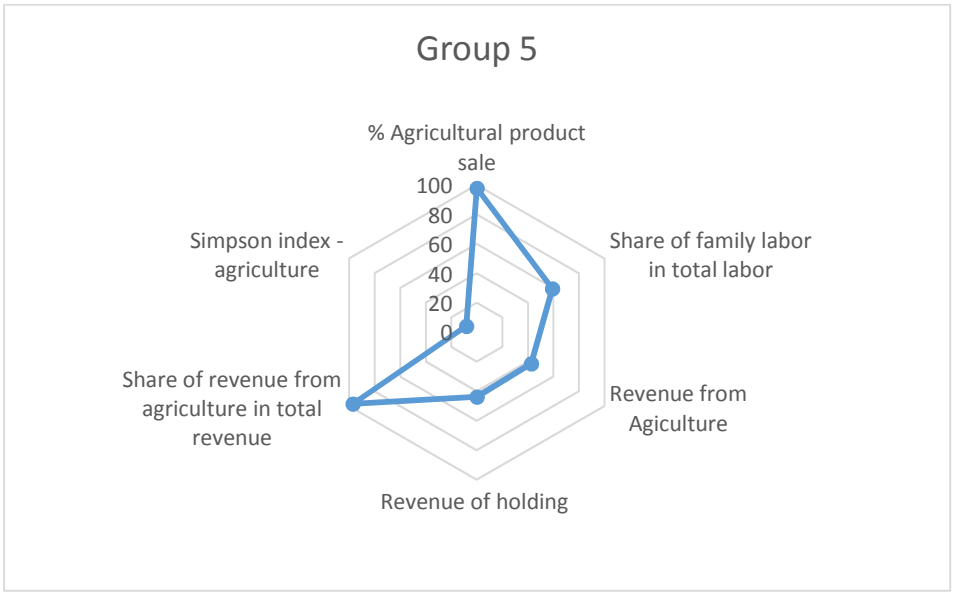


Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO

➢ ***Group 5 "Medium commercial farms"*** (17.6% of sample)

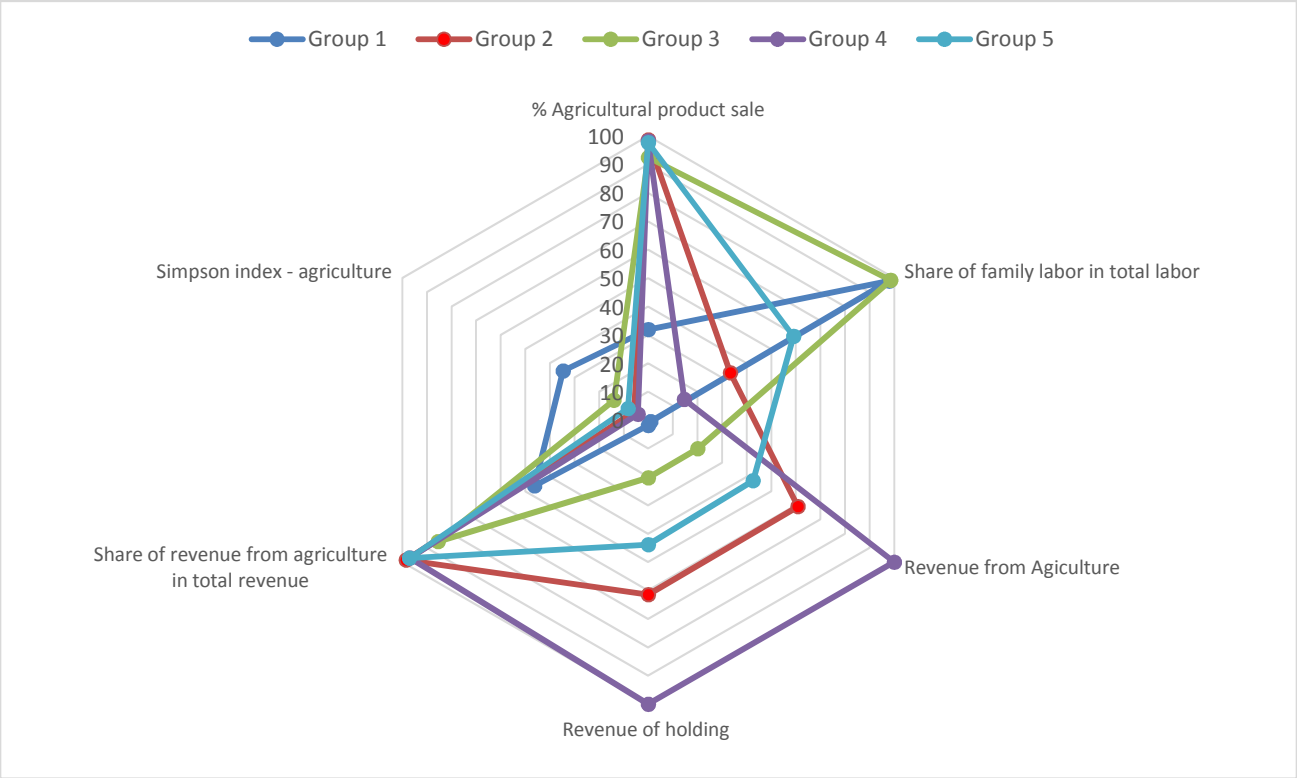
The majority of the holdings in this group are commercial farms, and 20% of holding heads are trained and hold professional certificates. The agricultural production is highly market-oriented as 98% of agricultural production (in value) is sold. Compared to Group 2 (large commercial farms) and Group 4 (very large commercial farms), the holdings in Group 5 use less hired labor (40%). This group is very highly specialized in agricultural production (Simpson index is 0.08). The production size is high and ranked in 3rd place (agricultural income and total income).

Figure 9: Radar-shaped characterization of Group 5



Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

Figure 10: Radar-shaped characterization of the 5 groups

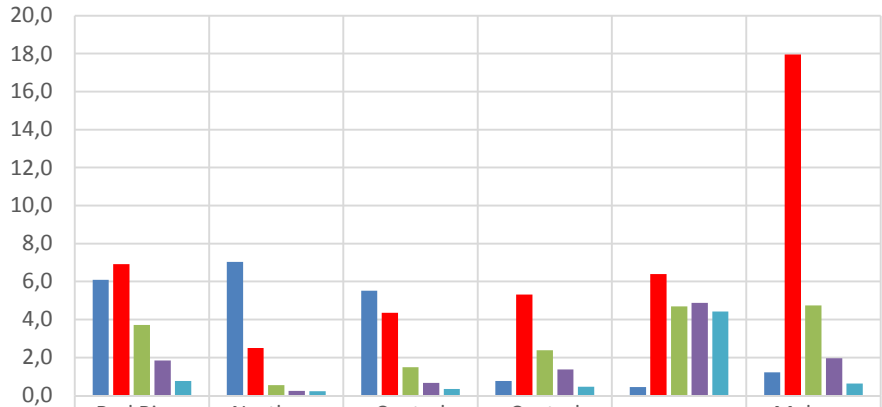


Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO)

2.2.2. *Typology of agricultural holdings by region*

The five groups identified in the typology work are unevenly distributed among the 6 eco-agricultural regions of the country.

Figure 11: Distribution of AH clusters by region



	Red River Delta	Northern Mountain	Central Coast	Central Highlands	Southeast	Mekong Delta
Semi subsistence agricultural HH	6,1	7,0	5,5	0,8	0,5	1,2
Market-oriented household farms	6,9	2,5	4,4	5,3	6,4	18,0
Medium commercial farms	3,7	0,5	1,5	2,4	4,7	4,8
Large commercial farms	1,9	0,2	0,7	1,4	4,9	2,0
Very large commercial farms	0,8	0,2	0,4	0,5	4,4	0,6

Source: Authors' calculation from VHLSS 2010 and ARC 2011 (GSO

Most of the semi-subsistence household farms (Group 1) are in the North and Central regions. Market-oriented household farms (Group 3) can be found in all regions, but this group is concentrated in the Mekong River Delta, Red River Delta, Southeast and Central Highlands regions. Large commercial farms (Group 2) are in the Southeast, Red River Delta, Mekong Delta and Central Highlands regions. Medium commercial farms (Group 5) are based mainly in the Southeast, Mekong Delta, and Red River Delta regions. Very-large commercial farms (Group 4) are concentrated in the Southeast region (60% of all very-large farms in Vietnam).

Red Delta River is an agricultural region. Due to limited land availability, agricultural activities are still mainly done at the household level (subsistence household farms and commercial household farms). A number of agricultural commercial farms have been established, that makes the region the runner-up in terms of very large farms.

Northern Mountain[14] is a poor region with limited production land. Accordingly, agricultural production is the crucial source of income for both subsistence households and commercial households.

Central Coast[15] is also a region with limited land, the majority of agricultural holdings thus belong to the subsistence household and commercial household groups.

In ***Central Highland***, where perennial crop production (coffee, fruit) is key sectors. The majority of agricultural holdings are market-oriented households and small commercial farms and normally, agricultural holdings in this regions have higher farming land size than other regions.

The ***Southeast*** is characterized by developed animal production and perennial crops (fruit, rubber). Agricultural production is characterized by a market-oriented strategy. Subsistence households thus represent only a small part of agricultural holdings in this region and the majority of agricultural holdings belong to the other groups.

Mekong River Delta is characterized by market oriented households and small commercial farms. Key sub-sectors of agricultural production are rice and aquaculture. Unlike the North and Central regions, agricultural holdings with significant production land are very widespread here.

In summary, in regions with limited land, the majority of agricultural holdings are household or small commercial farms. In regions with relatively abundant land and developed agriculture, most of agricultural holdings are commercial farms or commercial

[14] This region is made up of two sub-regions: Northwest and Northeast
[15] This region is made up of two sub-regions: North Central Coast and South Central Coast

household farms. This distinction suggests that land size may be a good variable for typology. The concern lays in big disparities of land categories between regions.

A shortage of available data from ARC prevented us from characterizing the groups by 5 capital assets: natural, physical, financial, social and human as proposed by WAW.

In conclusion, our work underlines the importance of large commercial farms in the current transformation of Vietnamese agriculture. However, it is important to keep in mind that household farms (Group 1 and Group 3) still constitute around 99% of the 10.4 million rural households in the country.

2.3. Stakeholder feedback

2.3.1. Local voice:

Local staff and stakeholders were asked to differentiate the types of households in their communes. In their responses, they did not use type of labor or the proportion of products marketed to characterize agricultural holdings. Instead, local people used other criteria:

Firstly, the general production system is used to classify rural households. Based on farm and non-farm activities, rural households are classified into 3 groups: i) HH of only farm activities; ii) HH of nearly only non-farm activities; iii) and HH of mixed activities (both farm and non-farm activities).

Secondly, agricultural production size is used to differentiate commercial farms and household farms. In Vietnam, the Government defines four forms of agricultural production: household (*hộ*), commercial farm (*trang trại*), cooperative (*hợp tác xã*), and company (*doanh nghiệp*). As stipulated by national laws and regulations, an agricultural production unit is recognized as a commercial farm, cooperative, or company if it is certificated by the local authority. Other agricultural production units are grouped into agricultural households. However, in practice, local people apply a 3-category typology for household farms and commercial farms:

- *Agricultural commercial farm (trang trại)*: refers to an agricultural production unit which is a granted commercial farm certificate[16] by the public authority. In some cases, the farms do not hold official certification (a farm may not want to get the certification) but their production size is big enough (by land area, animal heads, etc.) for these farms to also be recognized as commercial farms. However, there is no common agreement on what production size should be considered as "big".

[16] The criteria of agricultural farm (Circular No. 27 dated on 13 April 2011 of MARD): *a) for crop farm, aquaculture or general farm*: i) minimum land size is at 3.1 ha for regions of Southeast and Mekong Delta, and 2.1 ha for other regions; ii) Commodity production value is higher than 700 million VND (at least 35,000 USD). *b) For livestock farm:* Commodity production value is more than 1,000 million VND (at least 50,000 USD); *c) for forest farm:* i) minimum land size is at 30 ha; ii) Commodity production value is more than 500 million VND (at least 25,000 USD).

- *Professional family farm* (*gia trai*): refers to an agricultural production unit which is not acknowledged to be a commercial farm and is not certified as such. Its production size is bigger than that of the average household farm but smaller than that of a commercial farm. It is an unclear term and is defined by local people based on their own perception.
- *Agricultural household (hộ nông nghiệp):* refers to an agricultural production unit of small production size. All agricultural production units that are not formally recognized (such as commercial farm, cooperative, company, or even professional family farm) are called "agricultural households" (or household farms) by local stakeholders.

Thirdly, scale and key agricultural production system are used to classify agricultural holdings. Based on these criteria, an agricultural holding can be called a livestock household, livestock farm, aquaculture household, cow raising household, pig farm, etc.

This classification of agricultural holdings by local people (household farms, professional family farms and commercial farms) is different from our typology (semi-subsistence agricultural household, market-oriented household farm, medium commercial farm, large commercial farm and very large commercial farm). Insufficient information does not allow us to match these two classifications. However, **Erreur ! Référence non valide pour un signet.** shows matching results based on our experiences:

Table 9: Match between classification of local staff and result of our typology

Classification by rural staff / local stakeholders	Result of our typology
Household farms	Semi-subsistence household farms (Group 1) Market-oriented household farms (Group 3)
Professional family farms	Market-oriented household farms + small Commercial household (Group 3), medium commercial farms (Group 5)
Commercial farms	Medium commercial farms (Group5), large commercial farms (Group 2), very large commercial farm (Group 4)

2.3.2. Experts' observations

The preliminary results of our typology were shared in the national workshop and appreciated by the participants. In addition to encouraging further work on this initiative, the following groups of observations and comments were provided:

- Experiences of holdings in agricultural production can be seen as a variable for typology exercise. For instance, the number of years that the head of the agricultural holding has been engaged in agricultural production. In fact, many

agricultural producers have gained good experience in agricultural production through a "learning by doing" process even though they do not hold any certificates. *(Response: in our opinion, this is a good suggestion).*

- The details of the methodology for the typology should be presented to facilitate readers' understanding. *(Response: this remark is addressed in the final version)*
- More calculations regarding family labor should be done. In the past, family labor largely was mobilized for land preparation, caring, harvest, etc., but machines are now used. Households therefore do not hire labor but they rent external machine services.

III. Result with household data from the VHLSS

This part presents the results of the typology of agricultural households (farms from ARC 2011 are excluded) by using only VHLSS data on agricultural household to do the typology. We use the same variables and statistical method that was applied to the combined set of household and farm data (section II) to test the relevance of the proposed variables in relation to the single set of agricultural household data.

3.1. Results of typology

The results indicate that agricultural households should be classified into 3 clusters.

Figure 12: Breakdown of agricultural households in clusters.

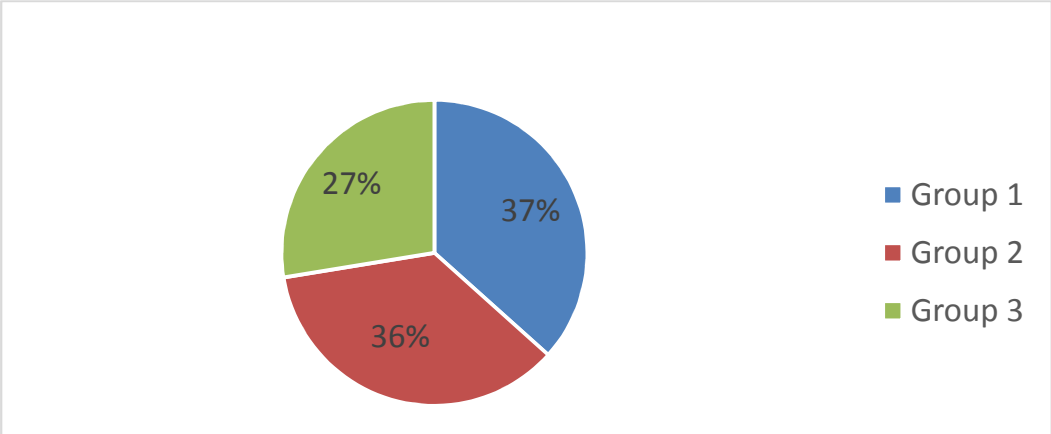


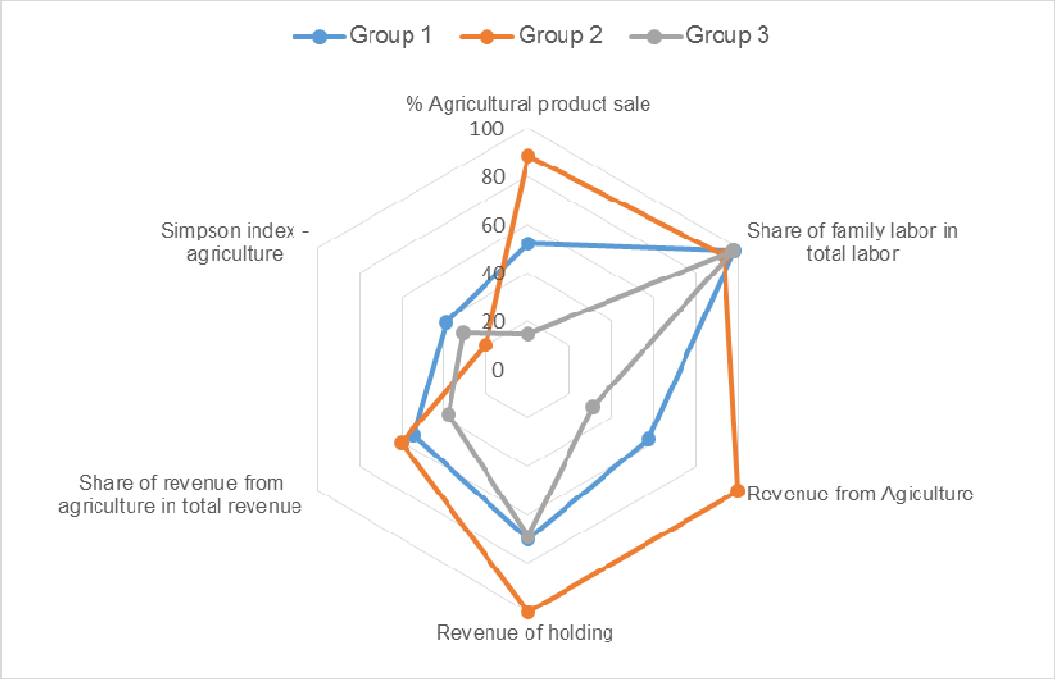
Table 10: Characteristics of groups by variables

Group	% agricultural product sold	Family labor in total labor used in agricultural production	Share of agricultural revenue in total revenue (%)	Total revenue from agriculture *(Thousand VND)*	Total revenue/ person/ month *(Thousand VND)*	Simpson index - agriculture	Profit/cost *(excluding family labor)*
Diversified group	52.23	98.07	54.16	26,958	903	0.39	2.04
Specialized group	88.17	93.63	60.01	46,888	1175	0.20	2.32
Semi-subsistence group	14.5	97.53	37.43	14,380	927	0.31	2.77
Total	54.7	96.33	51.65	30,627	1007	0.30	2.34

Source: Authors' calculation from VHLSS 2010 (GSO)

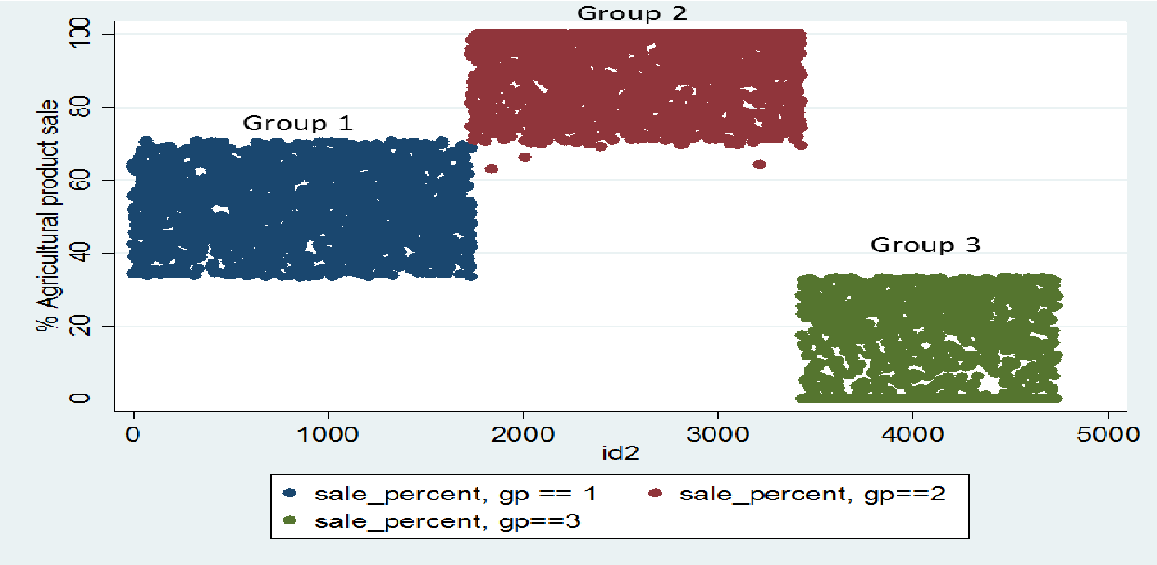
Characteristics of the clusters are presented in radar graphs (*Figure 13*). Differences can be seen in the variables: % of agricultural product to be sold, Simpson index, agricultural revenue, total income, and share of agricultural revenue in total income. Meanwhile, there are no differences among the clusters on 2 variables used for the typology: professional qualifications of holding head and share of family labor in total labor used for agricultural activities. The market-related variable (sale of agricultural product) is much differentiated among the 3 clusters.

Figure 13: Radar-shaped characterization of clusters



Source: Authors' calculation from VHLSS 2010 (GSO)

Figure 14: Level of market integration by holding clusters



Source: Authors' calculation from VHLSS 2010 (GSO)

As shown in

Figure 14, it is clear that Group 3 (accounting for 27% of the sample) has the least market integration (less than 38% of agricultural production is marketed). This group gathers "*Semi-subsistence households*". Otherwise, agricultural households in Group 1 sell from 38 to 73% of their total agricultural production and can be named, "*Diversified households*". Group 2 consists of agricultural households which sell more than 73% of their total agricultural production in the market. These households can be considered as "*specialized households*". Group 1 and Group 2 can together be qualified as "Market-oriented households".

3.2. Characteristics of clusters

3.2.1. Natural capital

Different factors reflect the natural capital of producers. However, the data that is currently available only allow us to characterize natural capital by household land. For crop land and water land, the specialized households have the most surface area, following by diversified households and then semi-subsistence households. For forestry land, it is the opposite, the semi-subsistence households have the most, and the specialized households have the least.

Table 11: Production land of household groups by land category

Group	**Water surface** *(m2/HH)*	**Forestry land** *(m2/HH)*	**Crop land** *(m2/HH)*
Diversified group	162	2,532	4,315
Specialized group	878	797	8,315
Semi-subsistence group	44	2,621	3,387
Total	386	1,935	5,414

Source: Authors' calculation from VHLSS 2010 (GSO)

3.2.2. Physical capital

In terms of value, specialized households hold a value of durable goods higher than the diversified and semi-subsistence groups. Regarding government support, semi-subsistence households have easier access to extension services (16.3% of households use extension services) compared to diversified households (12.8%) and specialized households (only 6%). This fact can be explained that most extension services are provided to the poor and nearly poor.

Table 12: Durable goods and access to extension services by HH groups

Group	**Durable asset** *(Mill. VND)*	**Access to extension service** *(% of HH)*
Diversified group	12.0	14.8
Specialized group	16.1	6.0

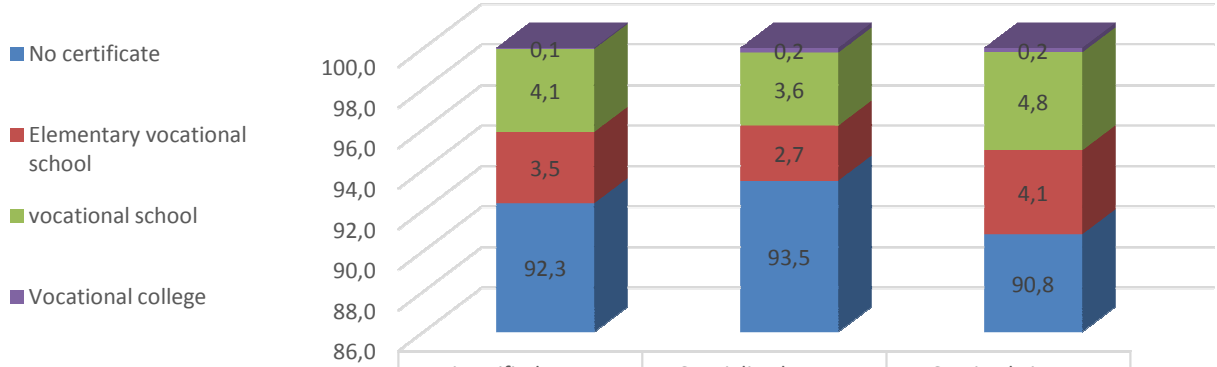
Semi-subsistence group	13.2	16.3
Total	13.8	12.0

Source: Authors' calculation from VHLSS 2010 (GSO)

3.2.3. Human capital

Differences among the 3 groups with regard to professional certificates is not clear (*Figure 15*). Accordingly, national experts suggested that the number of years that a household head works in the agriculture sector be used because this variable can capture knowledge and experience through a "learning by doing" process.

Figure 15: Professional qualification of 3 groups of agricultural households



	Diversified group	Specialized group	Semi-subsistent group
Vocational college	0,1	0,2	0,2
vocational school	4,1	3,6	4,8
Elementary vocational school	3,5	2,7	4,1
No certificate	92,3	93,5	90,8

Source: Authors' calculation from VHLSS 2010 (GSO)

3.2.4. Financial capital

The specialized households earn the highest monthly individual income (1175 thousand VND, equivalent to 55 USD). The semi-subsistence and diversified groups earn less. With regard to preferential credit, on average, a household receives around 12 million VND (about 600 USD) of preferential credit and there is no difference among the 3 groups in gaining access to preferential credit.

Table 13: Income and access to preferential credit by HH groups

Group	**Monthly individual revenue** *(1000 VND)*	**Preferential credit** *(mill. VND)*
Diversified group	903	13.1
Specialized group	1175	11.6
Semi-subsistence group	927	12.6
Total	1007	12.6

Source: Authors' calculation from VHLSS 2010 (GSO)

3.2.5. Social capital

Normally, variables like network, relationship, community role, etc. can be used to capture the social capital of rural households. However, this information is not available in the VHLSS, so different indicators were employed as indirect variables: percentage of poor households in group and percentage of men as household head. It is argued that in society, men are more respected and valued than women, so households with a man as the head may have more social capital than a household with a woman as the head. Poor households, due to their capacity or inferiority complex, etc., also may have less social networks or social relationships. The analysis indicates that there is no difference among household groups in terms of the gender of the household's head. In all groups, most household heads are men.

The semi-subsistence households are the most exposed to the poverty incidence (21.7% of households). The poverty rate for diversified households and specialized households is 15% and 7.3% respectively. There is indeed a strong relationship between the level of market integration and poverty.

Table 14: Male HH head and poverty rate by HH group

Group	% with male HH head	% of poor HH
Diversified group	85.0	15.0
Specialized group	83.0	7.3
Semi-subsistence group	83.4	21.7
Total	83.8	14.1

Source: Authors' calculation from VHLSS 2010 (GSO)

IV. Recommendations for the way forward

4.1. On variables used for typology

From the pilot results of Vietnam, we propose some variables to be used in the typology exercise at the national level:

- Commercialization (market integration) is a pertinent variable. This variable performs well in both the case of the combined data set (household + farm) and the single data set (household).

- The labor variable is pertinent only when we have data on both farms and households. In the case of household data only, this variable is not pertinent since it is relatively homogenous between households with regard to the proportion of family labor used for agricultural activities. This variable needs to be clearly defined. As we

mentioned above, farm households who used to employ a lot of family labor for agricultural activities have shifted to buying mechanical services. In the place of hired labor, producers thus rent external services. Accordingly, the rented external services (*in value)* variable, incorporated with hired labor, could be tested. Replacing the family labor variable by a mechanical level variable can be taken into account.

- The professional qualifications of holding head variable does not show clear and convincing results due to the absence of difference between groups. We need a variable which captures the competence/capacity of a household in making production decisions. The number of years of experience in agricultural production (suggested by national experts) seems to be a more pertinent variable, in particular in a developing country and in the case of household-based production. Experience and knowledge about production can be accumulated through a "learning by doing" process.

- Variables capturing the production strategy of agricultural holdings could be "*percentage of agricultural production value in total production value*" (strategy between farm and non-farm activities) and "*Simpson index of agricultural activities*" (strategy between diversity and specialization).

4.2. Statistical method for typology

We prefer the K-mean method since it enables one to avoid a subjective definition of variable thresholds and it allows one to do a typology using a large sample with both continuous and category variables.

4.3. Communication and Coordination (WAW initiative and WAW secretariat)

We acknowledge that the WAW secretariat has been implementing this initiative well. Experts around the world have been gathered to share their experiences, and to discuss and develop an international method. Pilot country teams have received valuable support in implementing country assignments. Further work on the WAW initiative is needed to produce a complete international typology methodology.

We suggest that the WAW host an international workshop to share and exchange experiences among pilot countries. An open forum will facilitate extended knowledge networks (sharing approaches, feasible variables, experiences…).

Typology trials currently are done with a national data set (national typology). Further actions are needed with typology at the sub-group level.

The currently available database does not have enough information for the typology exercise. After identifying the information needed, WAW/FAO and national institutions

recommend that national statistical offices collect complementary information for an in-depth typology of agricultural holdings at all levels.

APPENDIX

Table 15: Results of typology of agricultural HHs from the VHLSS

Criteria and associated variables	Definitions and support variable	Categories / types proposed			Comments, analysis
Categories		1	2	3	
Category name		Diversified household	Specialized household	Semi-subsistence household	
% of total holdings		36.63	35.80	27.57	
Family labor vs hired labor	Family labor in total labor used in agricultural production of HHs	98.07	93.63	97.53	
Commercialization level	% of agricultural products marketed	52.23	88.17	14.50	
Average surface					
- Water land (m2)		161.7	878.0	43.5	
- Forestry land (m2)		2532.1	796.6	2620.8	
- Crop land (m2)		4315.3	8315.4	3386.7	
Land rental (*Thousand VND)*		231.8	553.8	77.2	
Average agricultural production	Total agricultural revenue *(Thousand VND)*	26958	46888	14380	
Average monthly income per person	Revenue/person/month	903	1175	927	
Other features					
- Share agricultural revenue in total revenue of HHs	%	54.16	60.01	37.43	
- Simpson index in agricultural activities	Crop, livestock, forestry, aquaculture, service in agriculture	0.39	0.20	2.32	
- Profit/ production cost *(excluding family labor)*		2.04	2.32	2.77	
Durables of HH (*Thousand VND)*		11997.3	16143.9	13205.9	
Access to agricultural extension	% of HH with access to agricultural	14.76	5.96	16.32	

	extension				
Total people of household	persons	4.1	4.1	4.0	
Poor HH	% of HH in group are poor	14.99	7.32	21.69	
Food consumption per capital	Thousand VND/month	919.8	929.1	920.1	
Share of livestock revenue in total agricultural revenue (%)		30.3	23.1	19.3	
Share of forestry revenue in total agricultural revenue (%)		4.9	1.7	7.6	
Share of aquaculture revenue in total agricultural revenue (%)		3.9	11.4	2.5	
Share of crop revenue in total agricultural revenue (%)		59.0	63.7	65.8	
Share of services revenue in total agricultural revenue (%)		1.9	0.1	4.8	

Source: Authors' calculations from VHLSS 2010 (GSO)

Table 16: Calculation of variables used for typology

No.	Dimension	Criteria or variable	Indicator	Needed information	Question	calculation
2	**Marketing (proportion of agricultural product sold) (in value)**	Total output of agriculture = Crop + Livestock + Forestry + Service agriculture + Aquaculture (Thousand VND)	Crop = Rice + Staple food crops, non-staple food crops, and other annual crops + Annual and perennial industrial crops + Fruit tree + Revenues from harvested by-products	Rice	4B1.1. Rice (column 8)	sum of (5,6,7) in Column 8
				Staple food crops, non-staple food crops, and other annual crops	4B1.2 (column 7)	sum of (8-21) in Column 7
				Annual and perennial industrial crops	4B1.3 (column 7)	sum of (22-38) in Column 7
				Fruit tree	4B1.4 (column 7)	sum of (39-54) in the Column 7
				Revenues from harvested by-products	4B1.5 (column 5)	sum of (1-10) in Column 5
			Livestock	Animal husbandry and hunting, trapping, domestication of birds and animals	4B2. (column 5)	sum of (1-19) in Column 5
			Service of agriculture	Agricultural services	4B3. (column 5)	sum of (1-5) in Column 5
			Forestry	Forestry	4B4. (column 3f)	sum of (1-14) in Column 3f
			Aquaculture	Aquaculture	4B5. (column 5)	sum of (1,2,3) in the column 5
		Total proceeds from sales or barter of agriculture = Crop + Livestock + Forestry + Service agriculture + Aquaculture ((Thousand VND))	Crop = Rice + Staple food crops, non-staple food crops, and other annual crops + Annual and perennial industrial crops + Fruit tree + Revenues from harvested by-products	Rice	4B1.1. Rice (column 7)	sum of (5,6,7) in Column 7
				Staple food crops, non-staple food crops, and other annual crops	4B1.2 (column 6)	sum of (8-21) in Column 6
				Annual and perennial industrial crops	4B1.3 (column 6)	sum of (22-38) in Column 6
				Fruit tree	4B1.4 (column 6)	sum of (39-54) in Column 6

				Revenues from harvested by-products	4B1.5 (column 2)	sum of (1-10) in Column 2
			Livestock	Animal husbandry and hunting, trapping, domestication of bird and animals	4B2. (column 4b)	sum of (1-19) in Column 4b
			Service of agriculture	Agricultural services	4B3. (column 5)	sum of (1-5) in Column 5
			Forestry	Forestry	4B4. (column 4)	sum of (1-14) in the column 4
			Aquaculture	Aquaculture	4B5. (column 4b)	sum of (1,2,3) in the column 4b
3	**Usage of family** *vs.* **hired labor**	Usage of family (working hours)	The most time-consuming (main) employment over the last 12 months	Self-employment in agriculture, forestry, aquaculture (column 1b=1)	Part 4A	column 3a * column 7
			The most time-consuming (main) employment over the last 12 months	Laborers in agriculture, forestry, and fisheries (Occupation code= 61, 62, 63, 92)	Part 4A	column 15a * column 19
		Hired labor (Thousand VND)	Hired labor for agriculture	Hired labor for crop production	4B1.6	value of order 15 in column 2e
				Hired labor for livestock production	4B2.2	sum of column 15 of order (1-11)
				Hired labor for Service of agriculture	4B3.2	sum of (1-5) in column 14
				Hired labor for forestry	4B4.2	sum of order (1,2) in the column 10
				Hired labor for aquaculture	4B5.2	sum of order (1,2,3) in the column 15

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